

REMARKS

Claims 1, 3-11, 13-18, and 21-28 are pending. Claims 1, 4-11, 13, and 15-18 have been amended. Claims 2, 12, 19, and 20 have been cancelled. Claims 21-28 have been added. No new matter has been introduced. Reexamination and reconsideration of this application are respectfully requested.

In the March 3, 2003 Office Action, the Examiner objected to claims 5, 6, 8, 11, 13, and 15 for various informalities. Applicants have amended claims 5, 6, 8, 11, 13, and 15 per the Examiner's suggestions, and respectfully submit that the Examiner's objections have been overcome.

Claims 1, 3-11, and 13-18 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,363,160 to Bradski et al. ("Bradski"). This rejection is respectfully traversed.

The Examiner also rejected claim 4 under 35 U.S.C. §112, ¶2 as being indefinite for failing to provide antecedent basis for "the HSV thresholding device." Applicants have amended claim 4 to provide correct antecedent basis, and believe the Examiner's 35 U.S.C. §112, ¶2 rejection to be obviated.

Embodiments of the present invention are directed to an automated calibration system to track a selected object through a series of frames of data. A display device displays at least one image frame received from an image input device. The image frame includes a calibration window. An image selection device utilizes the calibration window to select the selected object in the at least one image frame to track. An image source device provides a hue saturation value (HSV) data array of pixels forming the at least one image frame. An analysis module determines analysis data for pixels within

the calibration window based on the HSV data array, and determines test analysis data for a set of adjacent test windows. Each of the adjacent test windows has the same shape as the calibration window. Tracking data, to track the selected object, is selected from one of the calibration window and the adjacent test windows having a highest tracking probability.

In the March 3, 2003 Office Action, the examiner rejected claims 1, 3-11, 13-18 under 35 U.S.C. §102(e) as being anticipated by Bradski. The Examiner stated that Bradski discloses an automated calibration system for tracking a colored object through a series of frames of data, and includes (a) a first processing device to execute a program to display an image frame; (b) an image selection device to select the colored object in the image frame; (c) an image source device to provide a hue saturation value (HSV) data array of pixels in the colored object; and (d) a second processing device to analyze the HSV data array and determine characteristics of the pixels in the image frame that are associated with the object based on a probability.

Independent claim 1, as amended, recites (with emphasis added):

1. (Amended) An automated calibration system to track a selected object through a series of frames of data, comprising:
a display device to display at least one image frame received from an image input device, wherein the image frame includes a calibration window;
an image selection device to select, via the calibration window, the selected object in the at least one image frame;
an image source device to provide a hue saturation value (HSV) data array of pixels forming the at least one image frame; and
an **analysis module** to determine analysis data for pixels within the calibration window, based on the HSV data array, and **determine test analysis data for a set of adjacent test windows, each of the adjacent test windows having a same shape as the calibration window, wherein tracking data, to track the selected object, is selected from one of the calibration window and the adjacent test windows having a highest tracking probability.**

Bradski discloses a method and apparatus for tracking an object using a

continuously adaptive mean shift. Bradski discloses digitizing a "talking head" image of a user into a set of pixels. A sample area of the image is used to build a flesh hue histogram, but hue values are only accumulated "if their corresponding saturation (S) and value (V) values are above respective saturation (S) and value (V) thresholds." [Col. 4, lines 20-22.] Once the flesh hue probability histogram has been created, video images are quickly converted into flesh hue probability distributions, and can be used to locate the center of an object and track the object. [Col. 4, lines 46-49 and 60-62.]

However, Bradski, does not disclose, teach, or suggest use of an automated calibration system to track a selected object through a series of frames of data, the automated calibration system including (a) a display device to display at least one image frame received from an image input device, where the image frame includes a calibration window; (b) an image selection device to select, via the calibration window, the selected object in the at least one image frame; and (c) *an analysis module to determine analysis data for pixels within the calibration window, based on HSV data array, and to determine test analysis data for a set of adjacent test windows, each of the adjacent test windows having a same shape as a calibration window, where tracking data, to track the selected object, is selected from one of the calibration window and the adjacent test windows having a highest tracking probability.* Independent claim 1, as amended, specifies an automatic calibration system to calibrate a tracking system which determine tracking data based on a comparison of (a) analysis data of pixels within a calibration window, and (b) test analysis data of a set of adjacent test windows having a same shape as the calibration window. Instead of analyzing any such test windows, Bradski teaches finding a center of an object based on a probability

distribution. Accordingly, applicants respectfully submit that independent claim 1, as amended, distinguishes over Bradski.

Claims 3-8 and 21-24 all depend, directly or indirectly, from independent claim 1, as amended. Accordingly, claims 3-8 and 21-24 also distinguish over Bradski for the same reasons as those set forth above with respect to independent claim 1, as amended. Independent claim 9, as amended, contains limitations similar to those of independent claim 1, and therefore also distinguishes over Bradski for reasons similar to those set forth above with respect to independent claim 1, as amended. Claims 11, 13-18, and 25-28 all depend, directly or indirectly, from independent claim 9, as amended, and therefore also distinguish over Bradski for the same reasons as those set forth above with respect to independent claim 9, as amended.

New claim 21 further distinguishes over Bradski. New claim 21 recites (with emphasis added): “[t]he system of claim 1, wherein the analysis module further includes a thresholding module to disregard pixel data for each of the pixels having a product of a saturation coordinate and a value coordinate below a predetermined threshold amount.” Bradski discloses disregarding accumulating hue values only “if their corresponding saturation (S) and value (V) values are above *respective* saturation (S) and value (V) thresholds.” [*Emphasis added*, Col. 4, lines 20-22.] However, Bradski does not disclose teach or suggest disregarding pixel data for pixels having a **product** of a saturation coordinate and a value coordinate below a predetermined threshold amount. Accordingly, applicants respectfully submit that new claim 21 further distinguishes over Bradski.

New claim 22 also further distinguishes over Bradski. New claim 22 recites (with

emphasis added): “[t]he system of claim 1, wherein the calibration window is smaller than the at least one image frame.” Bradski discloses no such calibration window. Accordingly, applicants respectfully submit that new claim 22 further distinguishes over Bradski. New claim 25 contains limitations similar to those of new claim 22, and therefore also distinguishes over Bradski for reasons similar to those set forth above with respect to new claim 22.

New claim 23 also further distinguishes over Bradski. New claim 23 recites (with emphasis added): “[t]he system of claim 1, wherein each of the adjacent test windows have a same size as the calibration window.” Bradski discloses no such calibration window or adjacent test windows. Accordingly, applicants respectfully submit that new claim 23 further distinguishes over Bradski. New claim 26 contains limitations similar to those of new claim 23, and therefore also distinguishes over Bradski for reasons similar to those set forth above with respect to new claim 23.

New claim 24 also further distinguishes over Bradski. New claim 24 recites (with emphasis added): “[t]he system of claim 1, wherein each of the adjacent test windows have at least one pixel overlapping with the calibration window.” As discussed above, Bradski discloses no such calibration window or adjacent test windows. Accordingly, applicants respectfully submit that new claim 24 further distinguishes over Bradski. New claim 27 contains limitations similar to those of new claim 24, and therefore also distinguishes over Bradski for reasons similar to those set forth above with respect to new claim 24.

New claim 28 also further distinguishes over Bradski. New claim 28 recites (with emphasis added): “[t]he method according to claim 9, wherein the method further

includes creating a pixel-classification look-up map for the HSV data array of pixels.”
Bradski discloses no such pixel-classification look-up map. Accordingly, applicants respectfully submit that new claim 28 further distinguishes over Bradski.

Accordingly, applicants respectfully submit that the rejection of claims 1, 3-11, and 13-18 under 35 U.S.C. §102(e) should be withdrawn.

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Applicants believe that the foregoing amendments place the application in condition for allowance, and a favorable action is respectfully requested. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call either of the undersigned attorneys at the Los Angeles telephone number (213) 488-7100 to discuss the steps necessary for placing the application in condition for allowance should the Examiner believe that such a telephone conference would advance prosecution of the application.

Respectfully submitted,

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